The Effect of Integrating Children with Autism Into a Physical Activity and Recreation Setting

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Schleien, S., Krotee, M., Mustonen, T., Kelterborn, B., & Schermer, A. (1987). The effect of integrating children with autism into a physical activity and recreation setting. *Therapeutic Recreation Journal*, *21*(4), 52-62.

Abstract:

The purpose of this exploratory study was to investigate behavior patterns of severely handicapped autistic children integrated into a physical activity and recreational milieu and to determine if there were significant changes in the subjects' social, leisure, and adaptive behavior skills from pre to post physical activity program treatment. Attitude toward the severely handicapped subjects by their nonhandicapped peers was also assessed. The subjects were two severely handicapped autistic children, ages 8 years, 5 months and 11 years, 2 months who measured 124 and 151 respectively in the Topeka Association for Retarded Citizens assessment system. Each subject was observed by a trained observer using the Social Interaction Observation System. This system assessed the subjects' social skills, orientation toward peers and objects, as well as appropriate and inappropriate play behavior and target behavior patterns. The results of the study revealed that there were some positive and significant increases in the amount of appropriate behavior and significant decreases in inappropriate behavior pre-post physical activity treatment. Attitude toward the subjects with autism by their nonhandicapped peers revealed positive, but insignificant improvement.

KEY WORDS: Autism, Fitness, Integration, Leisure Skills, Physical Activity, Severely Handicapped, Sport, Therapeutic Recreation

Article:

At no time in the history of humankind has the need for worthy use of leisure time in the form of engaging in wholesome physical and recreational activities emerged to the forefront as it has in today's society. The rediscovery of the human body and the importance of movement as an essential element of human life contributing to the cognitive, psychomotor and affective domains of the developmental process is well documented and has permeated our societal structure at every level (Barrow, 1971; Krotee & Bart, 1986; Krotee, 1980; Krotee & Hatfield, 1979; Ulrich, 1982).

The opportunities to engage in a planned program of physical activity and accrue the physical, cognitive, and psychosocial dividends from its wholesome learning environment are not shared by all. Despite the enactment of Public Law 94-142, the Education for All Handicapped Children Act (1975), and its amendments (P.L. 98-199; P.L. 99-457), special populations, including persons with severe handicaps, autism, mental retardation, and physical and learning disabilities are still not fully or effectively integrated into our school, community, and recreational settings (Bronfenbrenner, 1986; Black, Freeman, & Montgomery, 1975; Morin & Reid, 1985; Putnam, Werder, & Schleien, 1985; Schleien & Werder, 1985). Furthermore, there appears to be little systematic planning for and implementation of such programs that are molded in the spirit of the principle of the least restrictive environment (Appenzeller, 1983; Certo & Schleien, 1982; Kennedy, Austin, & Smith, 1987; Krotee & Lincoln, 1981; Reynolds & O'Morrow, 1985; Schleien & Ray, in press; Ulrich, 1982; Webster, 1980).

The deprivation of systematic physical education and recreation experiences, embraced by the lack of opportunity for integrated physical and psychosocial learning experiences, has restricted the handicapped child from developing basic motoric patterns, psychomotor competency, psychosocial awareness, physical prowess,

fitness, and a diverse leisure repertoire. This lack of opportunity has also deprived the normal child from gaining in knowledge, understanding and appreciation of the handicapped individual through personal experience in a nonrestrictive, integrated environment. Direct contact and frequent interaction between handicapped individuals and their nonhandicapped peers have been shown to stimulate the formation of more positive attitudes (Hamilton & Anderson, 1983; Handlers & Austin, 1980; Voeltz, 1982).

One way to bring about these face-to-face learning experiences is through participation in integrated physical activity and recreation programs. Clearly, it is a goal of the recreation and physical education professions to provide planned learning environments that facilitate cooperative learning and social integration. This may potentially enable each individual to develop to his/her fullest potential. It is with this objective in mind that this exploratory study was formulated. The focus of the study was to examine the effects of participation in a planned physical activity and recreational program on the social, recreation, and adaptive behavior skills of children with autism. A secondary thrust of the study was to assess the attitudes of nonhandicapped peers as a result of an integrated experience toward the children with autism involved in the program.

Methods

Subjects

The subjects involved in the study consisted of two severely handicapped autistic children age 8 years, 5 months (female, S^1) and 11 years, 2 months (male, S^2) as well as 67 nonhandicapped children aged 7-12 enrolled in the University of Minnesota Children's Sport Fitness School (CSFS). S^1's overall mental age classified by the Psychoeducational Profile (PEP), a developmental approach to the assessment of children with autism and other developmental disabilities (Schopler & Reichler, 1979), was 27-31 months. S^2 received a PEP score of 35-38 months. The PEP instrument cites concurrent validity with coefficients of correlation between the PEP and other assessment instruments as high as .85.

The two autistic subjects' total scores on the Topeka Association for Retarded Citizens assessment system (TARC), a behavioral assessment inventory for severely handicapped children concerning education-related skills (Sailor & Mix, 1975), were $S^1 = 124$ and $S^2 = 151$, respectively, out of a possible 194. S^1's TARC skills assessment included scores of 41, out of a possible 50, in self help skills, 46 of 61 in motor skills, 14 of 38 in communication skill and 23 of 45 in social ability, while S2's TARC rating included a 46 in self help skills, 48 in motor skills, 27 in communication skills and 30 in social ability.

S^1's target excess behaviors, as measured by the Social Interaction Observation System (SIOS) (Voeltz, Kishi, & Brennan, 1981), a multi-variable observation system, included crying, moaning and tantrums characterized by thrashing of arms and throwing the body to the floor. S^2's target excess behaviors included grabbing objects from peers without provocation, screaming in high-pitched tones and self-injurious behavior including repetitive striking of the chin. Each subject attended a special wing for autistic children in a Minneapolis, Minnesota public elementary school during the regular school year and was enrolled in the University of Minnesota's Children's Sport Fitness School in the summer together with 67 nonhandicapped students from the metropolitan area.

Setting

The setting for the study was the CSFS, a three-week summer program sponsored by the School of Physical Education and Recreation at the University of Minnesota. The program was conducted at four proximate locations on the University campus: (a) a large 1,175 square meter gymnasium with various standardized and modified courts (e.g., badminton, basketball, volleyball) marked on the floor, (b) a smaller 365 square meter gymnastics room equipped with mats, mirrors, balance beam, side horse, parallel and horizontal bars, (c) an adjacent 11,808 square meter outdoor sports field, and (d) a 25 meter swimming pool. Supplemental equipment appropriate to the planned activity, including balls, bats, rackets, scooters, and nets were pro-vided by the CSFS. Classrooms, human performance laboratories, tennis, squash and racketball courts as well as an indoor fieldhouse were also made available for utilization.

Description of Staff/Training

Salaried graduate students (N = 10) at the master's and doctoral levels in the School of Physical Education and Recreation at the University of Minnesota served as instructors for the program. Because their contact with handicapped children was generally limited, the instructors observed a "Special Friends" slide/sound presentation (Voeltz, 1980) prior to implementation of the integrated program. The "Special Friends" presentation introduced the instructors to the concept of integrated programs and peer interaction interventions. At that time, the instructors also discussed the objectives of the integrated sport fitness program with the principal investigator.

Procedures

Two severely handicapped autistic children, whose parents expressed a need and desire for their children to participate in the program, and were willing to enroll their children in the program, were selected as subjects. Each subject's physical activity and recreational preferences were identified by their parents, adapted physical education teacher, and special education classroom teacher in order to determine if personal preferences influenced the autistic childrens' behaviors in the various settings. Both handicapped and nonhandicapped children were registered, standard uniforms distributed, and parents contacted regarding the nature of the integrated program and research study as prescribed by the procedures set forth by the University of Minnesota Committee on Human Subjects.

During the first week, an ecological analysis (Certo & Schleien, 1982; Certo, Schleien, & Hunter, 1983) was conducted to determine the physical activity skill and behavioral requirements for the subjects with autism. As part of the ecological analysis and over a period of 2 days the nonhandicapped children were observed participating in physical and recreational activities in four settings (large gymnasium, small gymnastics room, outdoor sports field, and swimming pool). From these observations and a pre- and post-program attitude acceptance scale, functionally age appropriate skill and social performance level and attitude were assessed to serve as reference points for the expected integrative performance level of the autistic children.

The "Special Friends" slide/sound presentation was presented to the nonhandicapped children, along with the CSFS staff, prior to the program's commencement. The presentation, depicting severely handicapped children interacting with their "special friend" peers in regular classroom settings, was shown separately to each of the school's three age groups. A brief question, answer, and sharing period followed the presentation. At that time, the children were informed that two severely handicapped autistic children would be enrolled in the three week CSFS. "Special Friends" were solicited to assist the autistic children, and those children who first volunteered to assist, and who matched the handicapped children in age and gender, were selected as "buddies." Three buddies were selected for each handicapped child—one to be a friend each week.

Program Implementation

The 3-week physical activity and recreation program, scheduled between 1:00 and 4:00 p.m., consisted of three, 40-minute activity periods including cooperative sports and games, swimming, and gymnastics followed by a 30-minute open recreation session. The CSFS participants were divided into three age groups (7-8, 9-10, 11-12) and received instruction in physical activity and recreational skills, as well as health and fitness related concepts. The first activity period was followed by a 10-minute break; the second activity session was followed by a 15-minute break; and the third activity was followed by 30 minutes of supervised open recreational play and/or individualized instruction. Each age group rotated from activity to activity throughout the afternoon, but merged during the open recreation period.

Recreational activities for each of the three 40-minute activity periods were generally located in the outdoor sports field, large gymnasium, small gymnastics room, and swimming pool, depending on the weather and the particular activity planned for that day. These physical and recreational activities included cooperative, competitive and individualistic play and games (the programmatic focus was on co-operative group activity), including modifications of traditional sports such as volleyball, badminton, soccer, and floor hockey, as well as fundamental movement, gymnastic, and aquatic skills. Acquisition of leisure and motor skills, cooperative play,

and self-improvement of motoric competency were emphasized. The planned physical activity and recreational program also included exercises promoting awareness of such physiological and psychosocial factors as heart rate, blood pressure, body composition, relaxation, stress management, posture and nutrition.

Analysis of Data

In order to determine the effects of participation in an integrated physical activity and recreation program on the behavior patterns of severely handicapped autistic children and attitudes of the nonhandicapped peers toward the participants with autism, a number of evaluative approaches were undertaken. An attitude acceptance scale was administered pre- and post-programmatic intervention to assess changes in acceptance by nonhandicapped participants toward their autistic peers. Behavior observations of the participants including appropriate and inappropriate play behavior and orientation to play objects and peers were assessed using the SIOS system and statistically treated to determine if significant differences in behavior from Week 1 to Week 3 occurred. Paired *t*-tests were used to determine if significant differences in attitudes and behavior were exhibited from beginning to termination of the program.

Attitude acceptance scale. An attitude acceptance scale for grades 3-6 (Voeltz, 1980; Voeltz, 1982), measuring social contact willingness, deviance consequation and actual contact was administered to the nonhandicapped children pre and post-implementation of the integrated physical activity and recreation program. Thirty-four randomly varied positive and negative statements concerning individual differences and handicapping conditions were presented in paper form and also read aloud to the children. In response, the children marked "yes," "no," or "maybe", depending on whether they agreed, disagreed, or were not sure about each statement. The investigators addressed any questions raised by the students. Aside from the high face validity of the attitude acceptance scale instrument, construct and predictive validity were supported by research with over 2,300 public school children in grades two through seven. With regard to the instrument's internal consistency, a split-half (Spearman-Brown corrected) of .82 and an alpha coefficient estimate of .77 were obtained (Voeltz, 1982).

Two of the 34 statements were employed to ensure each child's comprehension of the material and/or willingness to cooperate with the survey. Two other statements reflected the child's general feelings about friendship and playing together. Each response was rated on an acceptance scale of 0 to 2; 0 indicated a negative response, "maybe" or 1 indicated a neutral response, and 2 indicated a positive response.

Behavioral observations. Observations of participants' behavior were conducted on interactions between the handicapped children, "Special Friends," and the environment through employment of the Social Interaction Observation System (SIOS). The SIOS system was used to record four major categories of behavior and was adapted from the original instrument which recorded seven behavioral categories, including information on over 44 individual behaviors for handicapped and nonhandicapped children (Voeltz, Kishi, & Brennan, 1981). Participants' behaviors in the areas of appropriate and inappropriate play, and orientation to play objects and peers were observed and recorded for both autistic and nonhandicapped children. Operational definitions of the three social behaviors (i.e., dependent variables) were as follows:

> Appropriate Play: Child engages in any behavior that is a component part of the current play activity which includes goal-directed activity, appropriate use of objects in a chronologically age-appropriate and socially appropriate manner for at least 5 consecutive seconds.
>
> Inappropriate Play: Child engages in non-goal directed, nonfunctional, purposeless, stereotypic, aggressive, and/or behavior out of context to the activity. Includes manipulation of objects in an inappropriate or incorrect manner for at least 5 consecutive seconds.
>
> Orientation To Play Objects And Peers: Child attends to other participants, instructors, and/or target object and is in position to engage in activity for at least 5 consecutive seconds.

A fourth dependent variable, individual target behaviors (i.e., crying and tantrumming for SI; hitting of the chin, screaming, and grabbing objects for S2) that were identified as serious behavioral concerns by the subjects' parents and respective special education classroom teachers were also observed and recorded for the autistic children. A target behavior was recorded if it occurred at any time during the 10-second observation period.

Two trained observers, a primary and a reliability observer, were employed to collect SIOS data, Monday through Friday, for 14 days. The reliability observer collected data on the first day of the program and every other day thereafter. In order to determine reliability for the 3-week instructional records, a reliability check was made by the trained reliability observer during all sessions. Interobserver reliability ranged from .75 to 1.00 and averaged .95 across the two subjects. Observer agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements. Observation procedures involved a 10-second observation period followed by a 10-second recording period, with recorded instructions dictating when to observe and when to record, transmitted through earphones to the observers. Data were collected for 15 minutes during each of the 40-minute activity sessions, Monday through Friday, for each autistic child (approximately 150 observation intervals per week). The order of observations was alternated to minimize the effect of the order of observation as a variable within the data set.

Results

Each subject was observed in three physical activity and recreation-specific activities for 10, 15-second intervals per day throughout the duration of the investigation (approximately 150 observation intervals per week). Paired t-tests were employed to determine if significant differences existed between week 1 and week 3 observations on the following four variables: appropriate play, inappropriate play, orientation to play objects and peers, and target behaviors.

Subject 1: The mean number of intervals during which SI played appropriately increased in all three activities from week 1 to week 3. During week 1, her behavior varied daily, but over time, her appropriate behavior stabilized. S^1's inappropriate play decreased from week 1 to week 3 (See Table 1). In orientation to play objects and peers, the mean number of intervals increased over the weeks for all three activities. S^1's target behaviors for two of three physical activity and recreational settings were found to decrease, but in a nonsignificant manner (i.e., gymnastics and swimming), with no recorded change in the sports set-ting (See Table 1 and Figures 1 and 2).

Subject 2: The mean number of intervals during which S^2 played appropriately increased significantly ($p < .05$) in all three activities from week 1 to week 3. At the same time, his inappropriate play decreased significantly in all three activities. His orientation to play objects and peers increased dramatically from week 1 to week 3 in all 3 activities. Target behaviors were also observed to decrease significantly in gymnastics. Target behaviors were found to increase, but at a nonsignificant level, in the sports setting, and decreased slightly in swimming from week 1 to week 3. (See Table 2 and Figures 1 and 2). For both S^1 and S^2, week 2 was universally an intermediate value between weeks 1 and 3.

The pre-post attitude acceptance scale administered to the nonhandicapped peers resulted in a nonsignificant ($p < .05$) but positive change ($\overline{X}_{pre} = 35.4$, $\overline{X}_{post} = 37.8$). This result may have been influenced by the unusually positive pre-test measures regarding acceptance of children with handicaps by the nonhandicapped participants of the CSFS as compared to the national pre-test norm ($\overline{X}_{pre} = 26.6$) and post-test norm ($\overline{X}_{post} = 27.7$).

Discussion

The results of the study indicated that appropriate play behavior and orientation to play objects and peers positively increased in all of the CSFS's physical activity and recreational settings. Appropriate play behavior was found to increase significantly in two of three physical activity and recreational settings for S^1 and increased significantly in each of the three settings for S^2. Significant increases occurred for the most part in the subject's preferred physical activity (i.e., S^1's preferred activity—swimming; S^2's preferred activity—gymnastics).

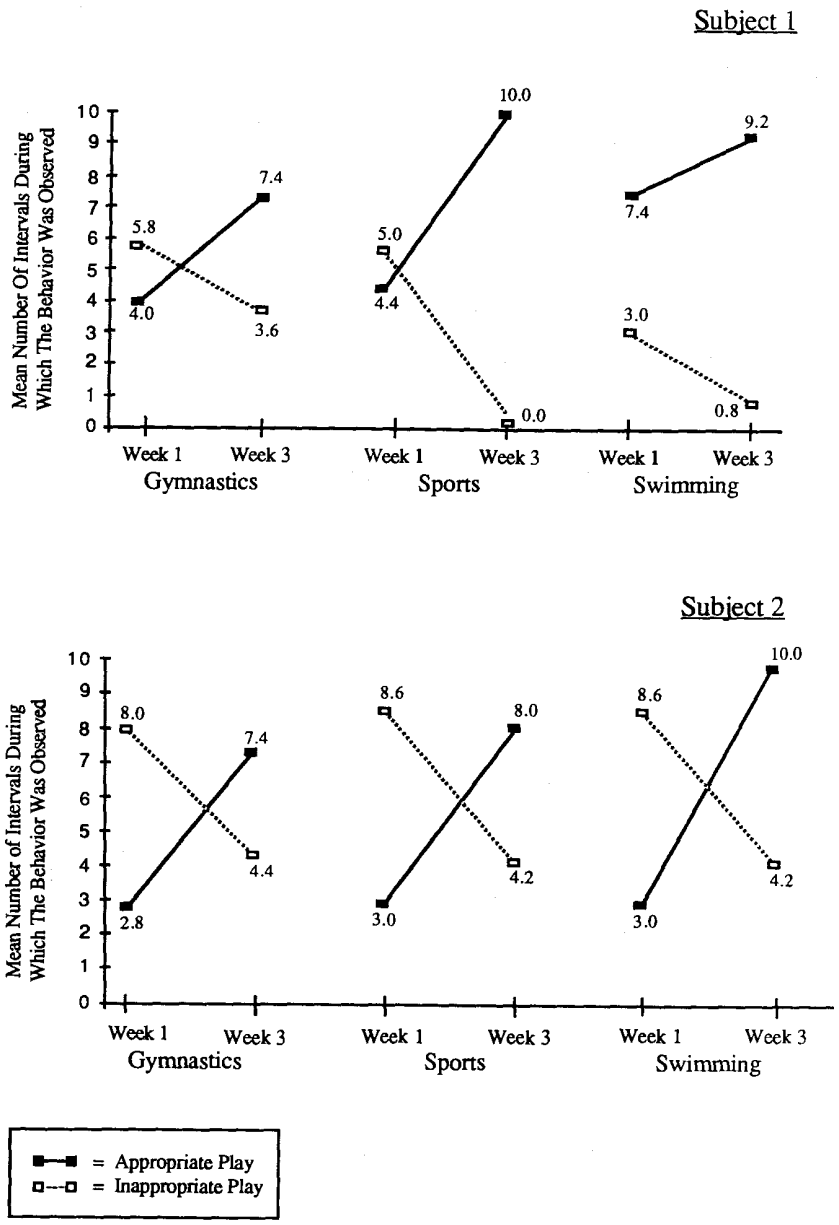

FIGURE 1. MEAN NUMBER OF INTERVALS OF APPROPRIATE AND INAPPROPRIATE PLAY BEHAVIOR EXHIBITED BY S^1 AND S^2 DURING WEEKS 1 THROUGH 3 OF THE CHILDREN'S SPORT FITNESS SCHOOL.

Concomitant with the positive increases in appropriate play behavior and orientation to play objects and peers, the study revealed substantial decreases in inappropriate play behavior for each subject. Significant decreases in inappropriate play behavior were found in swimming, the most preferred activity of Subject 1, and in all of Subject 2's physical activity and recreational settings. However, it should be noted that inappropriate play behavior was not reduced to a level equal to the non-handicapped peer group as determined by the initial ecological analysis (i.e., inappropriate play behavior exhibited by nonhandicapped participants was less than 5% across all physical activity and recreational settings). Opportunity to participate in preferred activities may play a crucial role in positive integrative recreational experiences for children with autism. The occurrence of target inappropriate behaviors for each autistic subject was found to remain stable at low rates or subside across all physical activity and recreational settings except for the sports setting for Subject 2, which revealed a nonsignificant increase from Week 1 to Week 3. It should be noted that a significant decrease in target inappropriate behaviors occurred in S^2's preferred activity (i.e., gymnastics) at the $p < .05$ level, although it should be noted that the decrease was from 1.0 to .5.

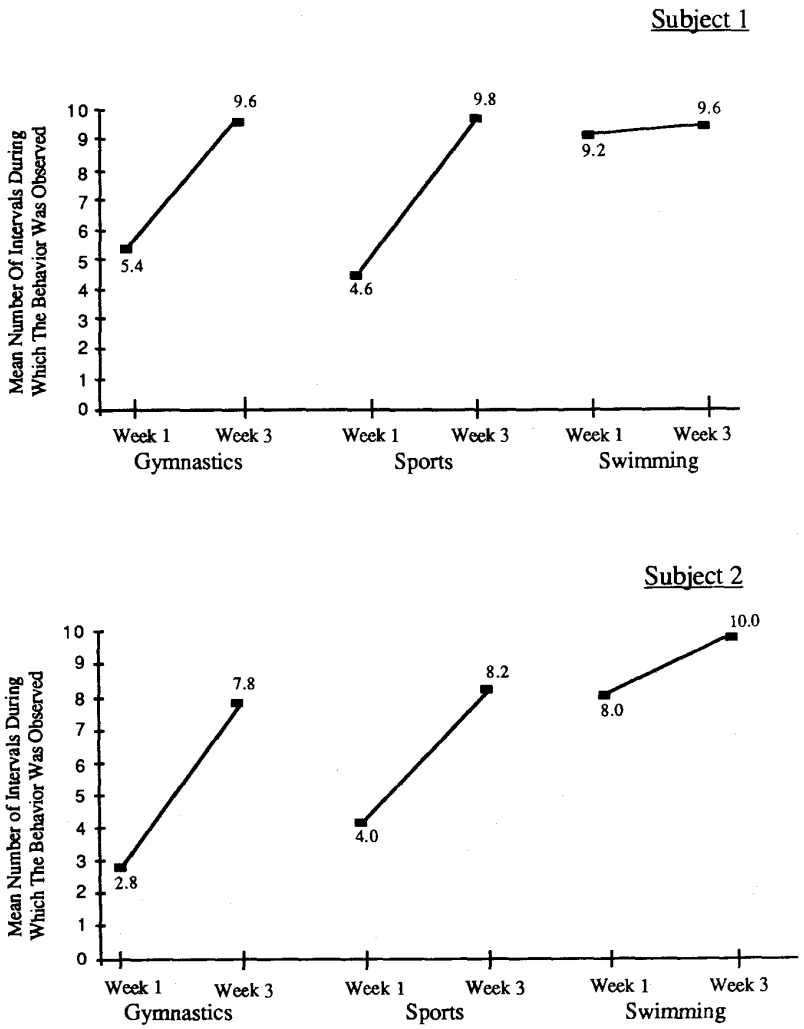

FIGURE 2. MEAN NUMBER OF INTERVALS OF ORIENTATION TO PLAY OBJECTS AND PEERS EXHIBITED BY S^1 AND S^2 DURING WEEKS 1 THROUGH 3 OF THE CHILDREN'S SPORT FITNESS SCHOOL.

Table 1.

Means and Standard Deviations Across Weeks and Activities for Subject 1

	Week 1		Week 3	
S^1	Mean	s.d.	Mean	s.d.
Appropriate Behavior				
Gymnastics*	4.0	3.08	7.4	2.41
Sports	4.4	4.56	10.0	0.00
Swimming*†	7.4	1.82	9.2	.84
Inappropriate Behavior				
Gymnastics	5.8	3.83	3.6	2.88
Sports	5.0	4.69	0.0	0.00
Swimming*†	3.0	2.24	0.8	.84
Orientation				
Gymnastics*	5.4	3.21	9.6	.55
Sports	4.6	4.34	9.8	.45
Swimming†	9.2	.84	9.6	.55
Target Behavior				
Gymnastics	0.2	.45	0.0	0.00
Sports	0.0	0.00	0.0	0.00
Swimming†	0.8	0.84	0.4	0.89

* Significant at the 0.05 level.
† Preferred activity.

Table 2.
Means and Standard Deviations Across Weeks and Activities for Subject 2

	Week 1		Week 3	
S[2]	Mean	s.d.	Mean	s.d.
Appropriate Behavior				
Gymnastics*†	2.8	1.64	7.4	2.30
Sports*	3.0	2.12	8.0	1.23
Swimming**	3.0	.71	10.0	0.00
Inappropriate Behavior				
Gymnastics*†	8.0	1.23	4.4	2.51
Sports*	8.6	1.14	4.2	2.17
Swimming*	8.6	1.46	4.2	2.17
Orientation				
Gymnastics**†	2.8	1.48	7.8	1.64
Sports	4.0	2.45	8.2	1.79
Swimming	8.0	2.35	10.0	0.00
Target Behavior				
Gymnastics*†	1.0	1.48	0.5	1.64
Sports	4.0	2.45	8.2	1.79
Swimming	0.6	0.89	0.4	0.55

* Significant at the 0.05 level.
** Significant at the 0.01 level.
† Preferred activity.

The positive behavioral and attitudinal changes revealed in this study suggest that the integration of children with severe handicaps and nonhandicapped peers into physical activity and recreational settings appears warranted. However, it would be remiss to attempt to integrate the severely handicapped individual without considering and attending to programmatic strategies to ensure that positive physical and psychosocial integrative outcomes accrue. The salient programmatic strategies involved in this investigation included the concern for personal activity preferences of the severely handicapped participants, the employment of cooperative group structures, and "Special Friends" training techniques.

The results of the study suggest that integration of students with severe handicaps into physical activity and recreational set-tings is both feasible and beneficial for those involved. Not only did some positive and significant behavior changes occur in regard to appropriate and inappropriate play behavior, orientation to play objects and peers, and target behaviors, but acceptance by nonhandicapped participants toward their severely handicapped peers changed in a positive but nonsignificant fashion as measured by the attitude acceptance scale. These positive integrative experiences serve to support the notion that more physical activity and recreational opportunities, as well as other dynamic social environs, should open their doors to individuals with severe handicaps and other persons with special needs.

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